



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## GRASPING, REACHING AND HANDLING

---

By GARRY C. MYERS, Brooklyn Training School for Teachers

---

*Mechanism for Grasping.*—The child is born with an automatic grasping mechanism which “goes off” when the proper place is stimulated. The trigger part of this mechanism at birth is most sensitive at the central palm. However, a stimulation of any part of the inner surface of the fingers may create grasping movements. After a few weeks the fingers become decidedly more responsive to grasping stimuli. On the 52nd day the baby herein studied grasped by his fingers firmly enough that one could pull him up by them, and 20 days later he would make grasping movements when even the back of the end sections of his fingers were touched. For several weeks, beginning near the end of the third month, while nursing, he would automatically grasp the round of the back of the chair in which his mother sat. Thereby he received painful injuries when she, forgetful of his habit, would hastily rise. Sometimes the chair was tipped, for the first effect of the consequent pull upon his arm was a tightening of the grasp.

The stimulus for grasping was evidently of the kinaesthetic sort and not that of touch. When at first the hand closed as the palm was touched it was a leverage, vibratory, sort of reaction. Probably the consequent stretching of the muscles of the palm stimulated them to multiplied contraction. The slightest vibration of pulling against the fingers stimulated grasp and the greater the pulling the stronger was the grasp. Certainly it was not a real touch sensation that immediately set off grasping. The human agent gradually learns, by trial and error, to use this wonderfully accurate mechanism in the various forms in which it develops during a life time.

*Thumb and Finger.*—From the first Baby's thumb closed outside of his fingers, but in opening the hand, the thumb tended at first to come in line with the first finger. Gradually from that time the thumb was extended more and more when the hand opened, up to the 195th day, when in reaching to grasp, the thumb was almost at right angles to the fingers. On the 272nd day, we dangled two spools on a double cord

in front of his face. The cord was seized at each end by the thumb and first two fingers, with most of the weight on the thumbs, which, with the hand moved in and out, toward and away from each other. Up to the end of the year when an object was grasped it was seized with thumb beneath, fingers on top. Probably this is nature's way of strengthening the thumb for the place it must have in the child's later experience. The fingers during the early months often made a variety of random movements, independent of one another. Frequently then any one of the fingers of either hand moved up and down while the others were perfectly still or, a finger remained still while the rest of the hand randomly closed. However, in seizing an object, there was perfect unity in the finger movements and by the 180th day the fingers tended always to move in line with one another. The development of the use of the index finger will be discussed below and the picking up of small objects between thumb and fingers will not be discussed in this paper.

*Field of Grasp.*—Practically from the beginning, and very decidedly by the third month, the hands, as a rule, moved within a small radius below his chin and often came to rest with palms half closed and vertical to his chest. In this position they often grasped each other, and the closer they were to each other the more unified appeared to be the movements. Therefore as any object came within the inward sweep of the hands it was grasped. When the hands gradually became independent of each other, this inward sweep of each hand still persisted, so that the field of grasp for each hand, at any moment, for several months was determined by the distance of the palm from the objects directly facing its surface.

There was such a gradual development of reaching for things that, even with the most careful observation, one dares not attempt to locate it on any one day. However, Baby apparently reached for the first time on the 94th day with a definite purpose, for a rattle held in front of him. The object was in the natural sweep of the hand and he moved his left hand in toward it, with the right following close behind. He focused his eyes upon the object as he reached for it. It should be noted that parallel with and prior to, the advancing field of grasp the focal accommodation, and consequently, the visual field developed. Four days later he readily grasped small objects when they were placed between his hands as the latter comfortably rested a few inches apart, about the lower part of his chest. On the 104th day

he grasped an object a few inches above his chest as he lay on his back. He also moved his right hand across his body just left of his breast bone and with eyes focused on my face touched my face; but it took considerable time to make the reach. Three days later he reached out several inches from his breast bone on the same side and grasped his rattler, and later vainly attempted to grasp my hand just above his face.

Even on the 109th day attempts to get either hand several inches across the median line of his body, were attended by much effort and not much success. On the 131st day he discovered the bonnet on his head and stretched it down over his face; he repeated this several times during the day. He dropped his rubber dog a few inches from his mouth, to the right, on the 168th day, and seized it with his left hand. He did not attempt to grasp objects by the hand of the side nearest the objects when they were very close to his body. On the 269th day when a bracelet was hung on his ear he reached vainly for it with the hand of the opposite side. Forty days later, when a small strip of cloth was put on his head so that it hung down between his eyes, he failed to get it after repeated trials, although he had long been able to pull a bean bag from the top of his head. Aside from these exceptions, however, by the middle of the year he could readily seize objects within the sweep of either hand, so long as volar movement was not required; and toward the end of the year, the body gradually tended more and more to aid the reaching arm in getting nearer the desired object.

*Scratching Movements.*—Practically from the first a stimulating of the ends of the fingers set off "grasping movements;" since the hands were often about the face, and were not very tightly closed, the finger tips often scratched and clawed, drawing blood on his face. On the 151st day he discovered that he could make a noise by opening and closing his hands when his finger tips touched my collar. After that time for several months he repeated this a number of times. When he felt over one's face he at once began a clawing that was unbearable. Opening and closing his empty hand with grasping movements did not begin, however, until the 285th day. By the middle of the year there was a wonderful modification of his reflexive grasping and clawing. He began then to softly feel over one's face with an attentive touch. Probably, attention to the touch sensations automatically inhibited. From the earliest weeks he put his hands out on his mother's breasts, but never once

clawed them. Probably the kinaesthetic sensations were the inhibitive stimuli. A few months later, although he would scratch mother's face at any other time, during nursing he would never scratch it. With fingers in a fixed clawing position, he began scratching objects with arm movement, apparently for touch and sound, on the 185th day.

*Use of One or Both Hands.*—During the first few months, when both hands partly closed were customarily near each other, palm to palm, either was apt to move toward the other when one was stimulated by an object for grasping, and long before he voluntarily grasped or reached for things, one hand grasped part, or all, of the other hand; at times parts of either hand were at the same time grasping the other hand. When an object was put near either hand the other hand invariably seized it or the grasping hand. But contemporaneous with voluntary grasping, during the early third month, developed independent reaching by either hand. For example, on the 94th day he put his rattle with his right hand into his mouth while his left hand lay motionless at right angles to his side. While there seemed to be no preferred hand save perhaps a little predominance of the left, by the 198th day, he almost invariably reached for things with the right. But the 114th day he would frequently grasp only with one hand and 24 days later he reached out one hand alone. He almost exclusively reached out with the right hand for things outside of easy grasping radius by the 183rd day. Since his wrists were not turned, objects back of his hands or, beyond the backs of his hands, could be grasped only by the hand of the opposite side and the right hand could reach much farther than the left across the median plane.

If by the 198th day, both hands were free, he would reach with both for things slightly beyond his grasp; but the right hand was always foremost and would reach farther than the left. He fairly "dived" for things and invariably reached with the right hand. By the end of the year he was more nearly ambidexterous in reaching. On the 343rd day, for example, he picked up a rubber ball by the right hand 36 times and by the left 12 times, while in all times but two it was thrown by the left hand.

*Holding Things.*—As with all his activities, so with grasping, attention toward the movement intensified it, and attention away from the movement weakened it. Therefore, the wide variety of new sensations he received upon beginning to grasp objects, meant that he tended to drop an object soon

after grasping it. Forty-five days after his first voluntary grasp he held his rubber dog as he looked at it, for the comparatively long period of one and one-half minutes. After about twenty-five more days he seemed to be able to hold a toy as long as he wished. Up to about the 170th day he would hold objects only by both hands; then he began to use one hand only, but he would hold the vacant hand near and in a position for grasping. On the 225th day he held and chewed a chicken bone for fifteen minutes without once dropping it and 75 days later he clung to an orange for about the same time, while he pointed to objects with the other hand. Then it was taken from him, and after it was given back, he held it for over one-half hour more. When angry and hungry on the 311th day, a graham wafer was given him; he neither ate nor dropped it, but held it in the same hand 50 minutes. Several times when ill, or when his feelings were hurt he would seem to get comfort from seizing a choice object. During a night of teething (348th day) he was given his rubber ball and he held to it for a half hour before falling to sleep and ten or fifteen minutes after.

*Errors in Reaching.*—For a few months casual observation shows that in reaching, he made errors of from a few inches to a foot or more. On the 163rd day he seemed to grasp at something in a window five feet away. However, I never saw him make any such error again. A number of tests made only four days later gave an error of no more than 12 inches. Then when an object just within his grasp, as shown by a large number of tests, was moved directly away from him he would hold out both hands as for grasping until the object was 10 or 12 inches away, when he would drop his hands, each to their respective sides. Likewise when the object approached him he would not extend hands until within about the same distance. This experiment was repeated on the 189th day when the error had decreased about one-half. From that time on his estimation of distance away from him, gradually became more accurate.

*Grasping His Feet.*—Baby discovered his feet on the 141st day and while on his mother's lap held his left foot with both hands; but the pleasure of the new experience caused him to extend his feet quickly and he lost his hold. Two days later he made two vain attempts while on his back on the bed, to seize his feet as they were kicked up. The left came up higher than the right. This kicking up of feet which developed almost instantly with his attempt to reach his feet

was not a purposive movement, but when he would reach forward toward his feet, thereby raising his shoulders considerably, the contraction of the muscles that brought up the feet was merely overflow innervation, such as is common in the development of any voluntary control of other parts of the body. On the 150th day he kicked up both feet and with both hands seized the left foot, but immediately lost it and failed in repeated trials. Six days later in the same manner he reached both hands for his respective feet, but succeeded only with the left; then he turned the right hand to assist his left. On the next day without looking at them he seized each foot by his respective hands. He could do this with wonderful precision and without looking at them, whether his feet moved wide or close. Since he could kick up his feet only when lying uncovered all the possible reactions were recorded. Therefore the wonderful improvement without intervening practices is very significant. On the 197th day he pulled off a shoe twice, and the next day he succeeded, after 15 minutes, in pulling off both stockings.

*Touch.*—Although from the first he experienced touch sensations from any part of his hands, there was no evidence of specialized touch organs at his finger tips, as in adults. However, the end organs of touch seem to have been deep, or faint, at least, in response. Probably from the beginning he got a great deal of touch sensation from his grasping process, but as late as the 152nd day my notes state that "while he was eager to drum over new objects, fixed surfaces, etc., and while he would bend forward in one's arms to thus 'touch' objects it was a hasty rubbing, drumming, grasping touch." By the 225th day there was an inordinate desire to touch things, expressed in squirms, twists, wriggles, and jumps of the trunk. Although the rubbing of the hand over objects was still heavy and hasty, by this time he would always spread his fingers wide apart, with thumb far from fingers while feeling over flat surfaces. This continued for at least a month.

Not until about the end of the eighth month did gentle, careful touching appear. Then he began to softly touch one finger of one hand by another finger of the opposite hand. With this kind of procedure the index finger predominated in touching. In a few weeks, he began examining more things, first by the index finger then by all the fingers. As will be described later the index finger always touched small objects before they were seized between it and the thumb. Even by the end of the year the finer touch sensations at the finger tips, such as an adult possesses, were comparatively faint and

seldom were voluntarily experienced. It might be noted that during the third month, when before voluntary grasping he got the finger tips of the hands softly together, he seemed to be getting touch experiences. Perhaps the chief results, however, were vibratory kinaesthetic sensations instead.

*Putting Things into Mouth.*—As soon as he was able to put his hands into his mouth, objects put into his grasp were carried there too; he naturally continued putting things into his mouth, after he had developed voluntary reaching and grasping. By the 252nd day objects too heavy for his grasp he rolled to his mouth, and for the first time, a new object was not immediately put into his mouth when given to him. Two weeks later he would almost invariably drum other objects with the new object before putting it into his mouth.

After touching a lettuce leaf cautiously with his index finger (305th day) he put it into his mouth, and less cautiously, a plantain leaf and a carnation. Two days later when a bunch of carnations was presented to him, without pausing to look at them, he put them into his mouth. It is obvious that the pleasure of reaching and grasping an object was far superior to that of looking at it. Toward the end of the year he became less likely to put foreign substances into his mouth and would generally give such things to his mother at her request; furthermore he offered little resistance to things being taken from his mouth. While in the first months any new object went first of all to his mouth, at the end of the year he used his mouth last as the medium of getting acquainted with an object.

On the 252nd day he for the first time released grasp of an object which he had put into his mouth, but held his hands as if ready to catch it. During the tenth month he began to grasp objects by his mouth and then to creep with them. On the 325th day he dragged his mother's shoe across the floor between his teeth, and when he could merely support his body in a creeping position on each hand several months before, he seized a newspaper by his teeth and shook it as a terrier shakes a rat; several times during creeping he seized a ball thus between his teeth.

*Reaching Objects with Hand Holding an Object.*—About a month after he began reaching for things, he started to reach for objects with the hand already grasping an object, while the empty hand was idle; for several weeks the seizing hand tended to reach for the new object. Probably the stimulus from the grasping of the first object spread to the arm thereby



and made the arm more ready to advance. Furthermore, the interest naturally directed to the occupied hand may have made it more prone to act. Added to these factors may be the effect of the new experiences just now developing of touching things with things.

This last factor cannot be the prime cause; for on the 189th day with the rubber dog in his right hand he reached again and again for his spoon, each time touching it just once with the dog, but not releasing his grasp. Of course the vibration thus caused would stimulate rather than help release the grasp. After repeated trials he put the dog into the left hand and reached slightly with the left; but after a little hesitancy he grasped the spoon with the empty hand. Even up to the 285th day he would often extend his occupied hand rather than the empty one toward objects offered him. Occasionally he would change the object in his hand nearest to the desired object to the other hand before reaching; but never up to this time did he immediately drop one object to take up another. Dropping objects will be rather fully discussed in a later chapter.

*Touching Things with Things.*—Contemporaneous with his reaching, developed his touching things with things. For example, on the 201st day he touched his mother's eyes with a spoon which he changed from one hand to another a number of times. He made no attempt to touch her eyes with empty hand. By the 210th day this desire had become so strong that as soon as a spoon was given him he reached it out to touch the nearest object. On the 331st day he found a broom splint on the floor and for ten minutes crept about the room touching things with it and smiling. Aside from the enlarging of his general field of activity, this touching things with things gave him a projected touch sense which was new and attractive.

*Reaching Distant Objects with Long Objects.*—In reaching for things he gradually learned from experience that he could touch things by an object, such as a spoon in his hand, which he could not reach with his empty hand. Likewise, after several smooth round sticks, varying from 6 to 14 inches in length, had been given him, he learned in his desire to hit things with them, that he could reach objects he could not reach with his shorter toys. For example, he learned on the 192nd day, that he could more easily reach the front of the carriage by the aid of his spoon; and 9 days later, after failing to reach his spoon with the empty hand (by his natural

inward movement) he tried to scrape it toward him by the aid of his rattler. When things on the table were removed beyond his grasp he hit them with his spoon. After repeated efforts, on the 259th day, to reach objects on the table, he seized a long round stick lying on the tray of his high chair and touched them first, then hit them.

*Hitting Things with Things.*—On the 198th day he held a piece of paper in each hand and by hitting them together made a rattling noise. The movement of the hands increased as the sound grew louder. At the beginning of the 7th month he held up a rattle doll in one hand and hit it with the spoon in the other. When we gave him a pan and a powder box on the 233rd day he took one in each hand and struck them together. In this movement there was always a preferred hand, i. e., one hand tended to move farther than the other. This tendency to hold one object partly or wholly still while the other did the hitting gradually gave place to equal movements for both hands. However, as late as day 254, he held a small block in the left hand and drummed it with a similar block in the right. He was as likely to hit one on the head as to hit any other object. By the 266th day he had developed a habit of striking a new object on another object before examining it with his mouth. However, on the 278th day he had a new block 12 min. 35 sec. before he began to drum with it. Up to the end of the year he often amused himself at various times by striking very hard with his toys on pans, boxes and metal bath tub.

*Moving Things by Things.*—By so frequently touching things with things in his hands he accidentally learned that he could move the touched object; and so, by the beginning of the eighth month, he would scrape objects beyond his grasp off the table by his spoon, making movements always toward him. On the 256th day he amused himself for over half an hour, scraping blocks and toys off the table by a coat hanger. He used the hanger to reach those within easy reach of his empty hand as well as those more distant. Having accidentally rolled one large bottle against another, he continued for 11 minutes to roll the second before the first, on the 325th day; six days later he rolled a ball by pushing it with a small block as he crept after it. He also rolled a ball by the remote end of a stick from a window shade.

*Handling Objects to One.*—For the first time, on the 299th day, he put the stuffed dog which G dropped, into her extended hand. Of course he did not release his grasp until

she seized the dog. Then without her request he handed it up to her from the floor to the couch seven successive times. Five days later, whether I asked him or not he would hand the ball to me. On his own initiative, after he had repeatedly knocked down the blocks (day 313) from the top of the milk bottle where I had built them, he handed them to me each time after he had knocked them down. With the beginning of the tenth month he started voluntarily to hand one small object such as a rubber band or splinter with "eh." He would readily release grasp but would not of his own accord drop them into one's hands. This readiness to release objects increased up to the end of the year.

*Pushing Things Away and Reaching for Them.*—After he began to sit alone on the floor, and especially after he could creep, he would push objects away from him, then reach for them. On day 278, after playing with a new block for 5½ minutes, he scraped it back and forth on the floor, pushed it away and then reached for it again and again, but after a number of failures I got it for him. He at once pushed it away again and reached for it. Forty days later he amused himself for several minutes with a slipper stretcher. He put it on the seat of a rocker, pushed it out of sight and released his hand; he reached for it again. Then for several weeks he showed a marked tendency to put things out of sight, drop toys behind the couch, push them under it and reach for them. As standing and walking developed this tendency gradually disappeared.

*Creeping for Things and With Them.*—Of course his creeping began in his desire to get desired objects; and as the first creeping was attended by great effort, and was very slow, he naturally reached for an object as soon as he was near enough. This tendency to reach for things on creeping for them, persisted even after he could move rapidly, to the end of the year. During the first few weeks of this procedure he invariably used his right hand in reaching for the object, pushed his body up and swung about on left hand to face one. When he secured the object he would always get up to a sitting position at once, and manipulate it with both hands. By the tenth month, he gradually grew more ambidexterous in reaching for things toward which he crept. However, the right hand always predominated to the end of the year.

After he had crept for about a month he began creeping with objects in his right hand. The object would strike the

floor with each creeping movement of the seizing hand. He crept thus the whole length of the room with a ginger ale bottle but he merely slid the bottle along between the "steps" while the seizing hand made regular strokes. Soon he was thus traveling over the floor with various objects. Up to the end of the year the left hand was seen but two or three times carrying an object when creeping and then only very small objects.

*Extending Both Hands.*—When he first reached to seize one's extended hands (145th day), both hands came in unison; by the 156th day with both hands he seized his respective feet without looking at them. Even when by the 177th day, he would extend hands without one's first suggesting it, both hands were offered. Furthermore when he wanted one to take him he extended both hands, but never during the whole year did he reach for two objects by both hands at once, although he practically always extended both hands to seize a new single object, almost to the end of the year.

For the first six months the extending of the hands was momentary, with one impulse, and would often be successively repeated. The sustained holding out of the hands did not appear until about the 198th day; then for 15 seconds he held out both of his hands to his mother until she took him. Likewise, toward objects desired his hands were not held out sustainingly until the 256th day, but were jerked upward and forward on one impulse, that was frequently repeated successively. Gradually only one hand was used to extend toward an object of interest, and with this development came a sustained holding of one hand toward the thing desired. The palms were always down, fingers and wrist a little curved. This pointing toward objects with the hand developed into pointing with the index finger which was first apparent on the 296th day and became quite pronounced by the end of the year.

*Volar Movements.*—During the first year the wrists were very rarely turned. The palms were practically never seen upward, save while the hands were above or beside his head when asleep, in which position they were never otherwise. On the 108th day after 4 minutes' attempt to grasp the pillow against which the back of his hand rested, he failed more than to rub the back of his hand over it and to scratch it with his finger tips as he bent his hand slightly backward. He was once seen, however, on the 129th day, with ends of

fingers of one hand clasped by those of the other hand, whereby a partial turning was effected by each wrist. The complete turning of the wrist was first in evidence near his mouth, when on the 125th day he completely turned his palm about to grasp a toy I held near his mouth. Heretofore he had merely lifted up the hand with its back toward an object near his mouth, and had sometimes pushed objects into his mouth in this manner. Inasmuch as so many things were put into his mouth, it is natural that he tended to develop the regular turning of the wrist in grasping and in holding objects near or in the mouth. Furthermore, with the adult, in the natural sweep of the hand toward the mouth the palm tends to roll slightly toward the upward position. After scratching a cushion which the back of his hand touched, he lifted up his hand a few inches and rolled it about with palm toward cushion. He clearly turned palm about to seize a basin in two successive trials on the 188th day. During the early sweep of the hands toward each other, just on the threshold of grasping and in all such movements during the rest of the year, the palms have been vertical. However, during the whole year, aside from the above noted exception, he was never seen to grasp a toy with palm upward.

*Strength Development of Hands.*—As records of other children show, the strength of his grasp at birth was phenomenal. A spoon seized on the first day could be released only by bending his fingers by one's own hand, and by the 153rd day he could hold himself up as well as pull himself up, by my grasping fingers hooked over his. However, after 25 more days, his fingers did not sustain sufficient firmness to thus pull himself up; his general grasp control had been developing, nevertheless, and on the 196th day, while on his back, he grasped a medium sized orange on his chest and raised it, clear of his body, to his mouth. He lifted a small orange to his mouth by his right hand, on the 224th day, and a medium sized Florida orange with either hand on the 254th day. On the 282nd day, a gas iron of  $5\frac{1}{2}$  pounds was placed beside him on the floor; he tried to pick it up but he could only tilt it over, push it along on its side, and tilt it back again. Forty days later while in a sitting position he lifted it clear of the floor. He tossed a pound of beans about by either hand on the 287th day and he readily lifted my large umbrella by one hand, on the 295th day. Eleven days later he lifted a quart milk bottle by either hand, and on the 326th day he put the milk bottle into a rocking chair.

He could lift his mother's shoe above his head with either hand by the 313th day and the next day he could slide a volume of Ladd and Woodworth's *Physiological Psychology* and one of James' *Principles* over the floor rather easily. Near the end of the year he could slide a chair about the room, either from his feet or his knees.

*Handling Things.*—When I put a rattler into his hand (70th day), he grasped and rattled it in an irregular manner for a few moments; then it dropped. It was not a purposive movement but it succeeded a pleasurable feeling which feeling was beginning to find expression in movement of the arms. Even on the 198th day, when given some bells, he did not rattle them by quick jerky movements. In fact that type of hand movement had not developed and he moved them back and forth in the right hand, rather gradually, describing an arc between his shoulder line and sternum. Then the bells were moved from hand to hand, and occasionally chewed. Toward the last of the 8½ minutes during which he held the bells, he moved his hands faster, both in moving the bells and in exchanging them from hand to hand. Probably this was expressive of a higher degree of pleasurable feeling. He proceeded in about the same way with a piece of paper, save that he made quicker movements and changed hands more frequently. By the 211th day he used his rattler in a different way from that of any other toy. He would shake it with quick jerky movements, and bring it around and flourish it in the air. He had learned to shake his bells effectively by the first of the eighth month; the most attractive object then was a piece of paper which he could tear, drum, rattle, crumple and, if permitted, chew. By the 256th day the shaking of bells and rattlers had gradually changed from a quasi-lateral movement to a movement almost directly up and down. This latter type persisted to the end of the year.

Instead of chewing a piece of cloth as a towel or a diaper within his reach, by the 268th day, he seized quickly and waved it with 2 or 3 jerks of the hands, when it was dropped.

*No Interference with Feeding.*—During the first weeks, when peppermint or Castoria were given him, he made reflex striking movements from his mouth outward; on the first day he automatically grasped the spoon with which the nurse was feeding him. Later, when we gave him warm water for colic we necessarily developed the habit of holding down his hands. On the 190th day, however, his hands were not

held, and when the first spoonful of water was given him he reached for the spoon with both hands; but when the second spoonful was raised he made no interference whatever, and none up to the last and fifth spoonful. After that he continued not to interfere with the spoon when given water to drink, nor with the cup, when he had learned to drink from it. At the end of the year (363rd day), when one put a cracker or a bit of breadcrust to his mouth, he would not raise his hands at all until one put in a large piece, and then merely to hold the morsel in his mouth. This is a striking example of the inhibition of strong movements as a result of attention away from the movement.

*Inhibitions.*—Feeling over my face, 187th day, he accidentally grasped my nose which he squeezed gently between his thumb and first finger; he did this again and again with wonderful precision. Four days later, he felt over my face carefully and softly, with no clawing whatever. He reached in the following ways toward a watch on the table with both hands on the 234th day (a) he inhibited left about half way; and seized with right; (b) he reached out left almost touching, but seized with the right which had moved just behind the left; (c) same as (b); (d) almost touched with left, but seized with right; (e) same as (d); (f) he took the watch with the right hand directly on final trial. In the first two cases the new experiences so attracted the attention that the regular movements did not occur, for attention away from a movement always minimized or ended it. The last case, however, is not so simple. Toward the end of the year after his hands had been slapped a few times for seizing prohibited articles he would often check reaching movements before their completion. At first the signal for such inhibitions was one's prohibitive tone, later a mere gesture or look, and finally no signal was apparently needed. Probably it was the emerging in memory of a past experience.

*Emotional Movements.*—Although a whole chapter will be devoted to "motor emotional movements," a few words are necessary here. During the first few months any attempt to move his hands, as in "Patacake," was met by resistance and the arms and hands tended to grow taut; but by the 164th day he released tension of his hands perfectly, for a few strokes of "Patacake," and opened the palm of his left hand almost entirely, while the right was a closed fist. Five days later the left hand opened perfectly in "Patacake," but the right only about half way. On the 182nd day he opened his

right hand fully and flat, as his mother slapped her cheek with it on the third stroke, but after a few more strokes he closed it; he did the same with "Patacake."

When manipulating objects (275th day), while in a high state of pleasure, he generally moved the empty hand in concert with the grasping one. This was especially true in the ringing of his bells. These unified movements occurred in series of from two to ten. Gradually this same type of movement by both empty hands developed, and at the close of each series, the hands tended to come to rest, clasped together palm to palm, in front of his body just below his chest. At the close of a series of these unified movements, on the 304th day, he made two successive audible hand claps. Seven days later, when one clapped Baby's hands saying "Patacake," he relaxed both hands freely, so that one could make a slapping noise. He slapped his mother's breast of his own accord, so as to get a loud sound. Hand-clapping soon became voluntary, and, during the last month and a half of the year it was a frequent expression of a high degree of pleasure. Herein is seen the genesis of applause.

During the last few months of the baby's first year his hand movements were employed chiefly in creeping and the development of walking.